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A BRIEF ON CONTENTS OF PUBLICATION (No. 12, 1950)  
 of DOCS OF THE INSTITUTE OF STRUCTURAL MECHANICS

Period: subject Symposium is published in Kiev by the Academy of Sciences of Ukrainian SSR; editor is V. V. Selyantin, active member of the Academy.

Issue No. 12 (1950) contains 12 articles. Below are given for each article, author, title, pages, and brief abstract.

1. A. D. Zmudin, "Tests on Models of Columns Used in the Palace of Soviets,"  
 subject: "Compressed Columns (riveted)," pp 3-51.

describes tests on 50 models with face riveting and procedures followed; computes the maximum loads on the models and compares them with the test loads. This work is a continuation of the author's work completed in 1939 and published (issue No. 43) in 1941 by the Academy. The present work was carried out under the administration of Construction of the Palace of Soviets, with the purpose of investigating by way of experiments the influence of seams, butts, joints, riveting, etc on the critical strength of models of compressional and compressional-bending columns (models of the stileolate and main frame used in the palace). Tests revealed that construction of joints and seams did not effect the maximum loads, which were sufficiently in good agreement with the theoretical maximum calculated without consideration for the joints.

2. K. I. Molenchuk, "Transverse Distortion in Wood," pp 55-74.  
 Investigates the transverse warping of wood caused by the non-uniformity of drying and shrinkage; obtains an analytical equation of the warping which permits one by calculations to establish the variation in form of the cross section of a wooden element in dependence upon its position in the trunk body; and finds a) the general law governing the warping of planks and b) the external indications which permit one to judge the nature and degree of distortion or warping of cross sections. The analytical dependences are confirmed by experimental data.

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3. K. I. Kolenchuk, "Distribution of moisture in the cross section of a trunk while in its unseasoned state," pp 75-83.

Gives the results of experimental investigations into the distribution of moisture in the cross section of trunks of green trees (Carpathian spruce, fir, pine, oak, birch, acacia, and walnut). In the cross sections are constructed the lines of equal moisture, thus representing the complete picture of the distribution of moisture in the cross section of a trunk.

4. A. I. Strel'ts'kaya, "Influence of transverse force on maximum load during bending of steel beams," pp 91-95.

Given formulas for determining the maximum load on beams during bending, taking into consideration moment and transverse force; discusses statically-determinate and statically-indeterminate beams for various loads; and investigates for two-marked beams the effect of transverse force as a function of scaling, load, and ratio of height of section to span of beam.

5. P. N. Varvak, "Designing of beam-walls with trapezoidal profile (cross-section)," pp 96-101.

Considers a plate of linearly-variable thickness loaded by forces in its plane; the differential equation describing the stressed state of such a plate is represented by finite differences for the solution of an irregular structure; by using the derived formulas one can solve approximately problems of practical interest.

6. L. N. Stavraki, "Stability of Spatial Skeletal Frameworks Having Thin-Walled Open Symmetrical Profiles," pp 102-154

Derives the basic functional relations and shows how to calculate the general stability of spatial skeletal frameworks according to the method of displacements, either considering or not the longitudinal deformation of the beams.

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7. B. D. Grozin and P. I. Kostetskiy, "Microstructure of friction surfaces," pp 156-168.

Give the results of an investigation into the structures of frictional surfaces; discover very hard surfaces not eroded by reactivities normal for tempered steel; the structures found differ from the structures of tempered steel by increased toughness, great hardness, and resistance to heat and corrosion.

8. D. A. Dreyper, "Physical state of the surfaces of steel, and strength During Repeated-Variable loads," pp 169-184.

Conducts an experimental study of the dependence of steel's fatigue point upon the physical state of the surface after mechanical working and handling; establishes the parameters of the physical state of the surface which determine the influence of the surface on the fatigue limit; clarifies the influence of the individual parameters of the physical state (microgeometry, hazing, structure) upon the fatigue point; establishes the influence of polishing burns on fatigue point; establishes influence of variation in cutting regimes upon fatigue point in connection with the effect of these variations on the physical state of the surface.

9. A. D. Kovalenko, "Second-Order Hypergeometric Functions in Connection with Certain Problems in the Theory of Elasticity," pp 185-199.

Lecture delivered 10 April 1947 at a session of the Academy of Sciences, Ukrainian SSR. Establishes a number of new relations among the hypergeometric functions, whose application simplifies the calculation of the axisymmetrical stressed state of circular plates and shells of variable thickness, and permits one to decrease the number of infinite series to be summed and to strengthen their convergence.

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10. G. S. Pisarenko, "Forced Transverse Oscillations of a Beam Under the Action of a Longitudinal Tensile Force, with Consideration for the Dissipation of Energy in the Material," pp 200-219.

Considers the case of forced transverse oscillations in a cantilevered beam when a constant tensile force is present, taking into account the dissipation of energy in the material. *Note:* Essentially the same work was published by the same author in the *Zhurnal fiziki*, Volume XIX, No. 12 (December 1949), under the title: "Calculation, by nonlinear mechanics, of the energy dissipated in an oscillating body," for a partial translation of which, see 00-a-98167.

11. Yu. V. Pogorelskii and D. V. Vaynsberg, "Problem Concerning the Action of a Blow on a Wall," pp 220-227.

Give a short survey of previous works devoted to investigations of the action of a blow by a heavy ball on a wall; propose a new approximate method for solving the integral equation describing the blow, which is based on the approximation of the striking force by a lower polynomial base function describing the displacement of the ball (one reduced harmonic); give a numerical example.

12. Yu. A. Mitropol'skii, "Steady-State Oscillations in Nonlinear Systems with Many Degrees of Freedom," pp 228-233.

In the solution of many problems in 'vibrotechnics' [oscillatory engineering] it is very important to investigate the stationary regimes of oscillation with amplitudes and phases constant in time. The present work is devoted to an investigation of the stationary one-frequency oscillations in nonlinear systems with many degrees of freedom under the condition that the nonlinearity be small, the systems are forced by an external sinusoidal force. Obtains the exact differential equations.

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